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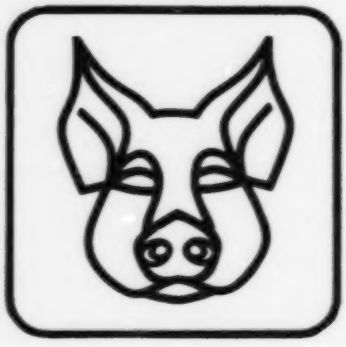

1982
MANITOBA ANIMAL INDUSTRY CONFERENCE PROCEEDINGS

A Forum for Professionals in Animal Agriculture

MANITOBA
AGRICULTURE

By Authority of Hon. Bill Uruski
Minister of Agriculture
Province of Manitoba

FORWARD

The Manitoba Animal Industry Conferences were established in 1978 to meet three basic needs for professionals in animal agriculture:

1. To enable individuals in research, extension and agri-business to become better acquainted with projects, programs and activities of those in other sectors.

2. To disseminate information, often in the form of research results, on timely topics.

3. To serve as a forum for presenting the problems confronting animal agriculture and for discussing possible solutions.

The 1982 program covered a wide range of thought-provoking, informative topics and provided those in attendance with ample food for thought and discussion.

The Planning Committee

1982 ANIMAL INDUSTRY CONFERENCE

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A FEED MANUFACTURER'S VIEW OF THE NEEDS OF MANITOBA'S LIVESTOCK INDUSTRY

Mr. Robert H. Slessor
Marketing Manager
Cargill Grain

Good morning ladies and gentlemen, and thank you for the opportunity to visit with you and share some our ideas with you. I would like to begin by saying that I plan to present a very brief paper on what my company feels are important, if not critical needs of Manitoba's Livestock Industry with respect to livestock performance and record keeping systems. Our company opinions are not necessarily being represented as those of the Manitoba Feed Industry Association. However, I do feel that most feed companies would tend to agree with the majority of the things I will say this morning. I say that with a fairly high degree of confidence because I believe that almost without exception, the common goal of the feed industry in Manitoba is to see the livestock producer generate a profitable return on his investments of labour, time and capital. And, it's fairly obvious to all of you, as it is to me, that unless the livestock producer is generating a profitable return, that our business is only made more difficult. We must have a healthy profitable livestock industry, preferrably growing, so that we in the feed industry are able to grow and profit as well.

In today's economic environment, which I suggest may well be with us to the end of the decade, the Manitoban livestock producer needs to be able to wring every potential profit dollar out of his operation. And the dollars are there! Just as surely as they were laying unclaimed in the street. These dollars are easier to gather by improving management systems, than investing more dollars at high and uncertain interest rates in expansion or modernization of current facilities. The trick is, to find those dollars laying unclaimed and put them in the producer's pocket.

I suggest to you that the best way to help the producer do that, is to help him understand his business better. And, the best way for a producer to gain a better understanding of his business is through the maintenance of better record keeping systems. You know, the livestock industry is quite unique. If you compare any intensive livestock production complex such as a 200 sow farrow to finish operation, or 20,000 bird laying operation to any other production industry having similar capital investment, you will usually be quite shocked to find that the livestock producer couldn't quickly answer some of these questions:

1) What is the exact dollar value of your current inventory?
2) What is the exact production cost per unit produced?
3) What is your break even point for the product you are producing?
4) Do you know what will happen to your profit picture if one of your major input costs is increased by 10%?

It has been my experience that the majority of livestock producers in Western Canada, not just Manitoba, do not keep livestock production and performance records, and the majority of those that do keep records don't utilize the data generated to their maximum potential. We see it in the feed business everyday, and I am forced as a marketing manager into generating marketing strategies to deal with it. And frankly, if you could help it would be greatly appreciated!

We are, as a company, committed to selling feeds wherever possible on the basis of feed performance and providing a sound technical service to our producers. This means that we have committed a large portion of our marketing budget to recruiting and training technically competent marketing people. In most cases, our marketing reps are university grads in agriculture, some are diploma grads in marketing with strong agricultural backgrounds. We further train these people in various aspects of livestock management, animal & poultry nutrition, and marketing skills. We feel that we are doing a good job of developing highly trained technical resource people that should be capable of selling to farmers on the basis of feed economic performance and technical services. Yet, we have a great problem in doing so, because the major problem or obstacle that these people are confronted with daily is "What's your price per tonne?" This is the major criteria for feed purchasing of the majority of livestock producers we deal with on a day-to-day basis. They are not in general, asking questions such as:

1) What will my feed cost per pig weaned or marketed be?
2) How many days to market will my pigs take on your feeding program? or
3) What will my feed cost per pig marketed be? or
4) What will my feed cost per pound of milk produced be?

And why aren't they asking these types of questions? Because, they don't have sophisticated enough record keeping systems to generate the simple data needed to make these calculations. And let's not make any mistake about it, these are the questions that they should be asking. Cost per tonne is only a relative value issue. Who cares if a feed will cost $10.00 per tonne more, if it costs less to feed the animal to marketed weight. The broiler producer is probably the best example of a successful record keeper when it comes to buying feed.

The majority of good broiler producers never ask for feed price per tonne. "Just tell me what dollar return over chick and feed costs I'll get on your program. That's all I'm interested in."

Certainly the broiler producer has grasped very firmly the relationship between performance records and the utilization of his performance data in making sound feed purchasing decisions. He wants to talk about feed conversions, days to market, and dollar returns, and you won't have a chance to get this man's business unless you're prepared to provide him answers to these questions.

I would guess, that would pretty much sum up what we feel the Livestock Industry needs more of. I think they need more simple record keeping systems that will show them how to do 3 things:

1) Firstly, gather simple production data to help in the monitoring of flock or herd production performance.
2) Next, analyze their major production inputs such as feed, on the basis of its economic performance in order that the purchasing decision become more analytical.
3) Thirdly, use these record systems in a way that they can effectively monitor and evaluate changes in operational management.

In many cases, we try to get a producer to either develop or begin utilizing a record keeping system, and in some cases we simply encourage him to begin using performance data he has to greater advantage.

In the case of hog producers, we have developed a sales tool called the sow herd profile. The basic approach with this tool is to begin asking the producer questions about his operation. The questions are designed to provide a series of baseline production data about the operation. The idea being, that once we begin encouraging the producer to generate records he can monitor the performance of his herd in certain key areas. Once he can monitor performance he can set goals for improvement of performance. It's a relatively time consuming effort, and we find that very few producers once started with record keeping systems, will allow them to fall into disuse. However, they do initially require a lot of individual attention to become total subscribers to the benefits of their new management tool. (SHOW OVERHEADS)

In the case of dairy producers, we deal with a completely different issue. Dairymen that are on milk recording programs such as the Federal Government R.O.P. ro Provincial DHIA programs, generally have no shortage of records. We find that most dairymen just don't utilize these records! They are at very best, utilized for individual cow culling on the basis of 305 day lactation records. But these records contain a wealth of information that help a dairyman get a much better handle on a number of various components of his herd management. (SHOW SLIDES AND OVERHEADS)

Currently, we are working on further development of these types of sales tools, with the long range goal of developing computer programs for our marketing reps. that will reduce the amount of number crunching that they do. The idea being to put our marketing people more and more into the role of being very competent technical people that will be another resource for the liverstock producer. We hope that our programs will help the producer utilize some form of performance record system that will eventually provide him with some of the information he needs to be very useful to him in picking up some of those dollars in the street I had mentioned earlier.

I would hope that we can help our livestock people generate perfectly accurate and totally useful information that will help them become better managers and decision makers. Thank you very much.

Robert H. Slessor

Marketing Manager

DAIRY PERFORMANCE TESTING

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When discussing performance testing in dairy herds we are essentially referring to the performance of individual herds and cows with respect to their production levels and milk composition. Accordingly, this presentation will be confined to a discussion of the various milk recording programs available to Manitoba dairy farmers and what has been achieved by them over the past few years. Other indices of dairy farm performance such as milk quality and herd health although important, will not be covered due to the time constraints.

Objectives of Milk Recording

Obviously, the main objective of milk recording programs is to increase the profitability of individual dairy enterprises through higher productivity per cow. The maximization of genetic gain through an informed selection process is a second objective that benefits not only individual enterprises, but also the industry as a whole. Progress in productivity improvement contributes to the strength of the dairy industry and to the general economy of the country and our province.

Necessary Elements

Some of the necessary elements of a successful milk recording program are:

- involvement of the dairy producer in the planning and operation of milk recording programs.
- provision of extension services to the producer.
- provision of individual animal milk yields and milk component values.
- authenticated records of uniquely identified animals.
- accurate records for genetic evaluations.
- uniformity of standards for all official programs.
- sufficient enrollment to ensure adequate sire appraisal.
- minimal turn-around times for output records.

Programs Available

R.O.P.

Canadian Record of Performance (R.O.P.) was initiated in 1905 by the Federal Minister of Agriculture at the request of various dairy breed associations and since then has grown to a Canada wide organization operated by Agriculture Canada. It provides for the establishment of production credentials for each lactation period of each individual of the several breeds of dairy cattle, as a basis for the

development of intelligent and constructive breeding programs.

In order to administer this nation wide program the country is divided into 23 zones with about 230 - 250 herds per zone. Usually there are 8 - 9 inspectors working in each zone each with responsibility for 25 - 30 herds. These inspectors arrive unannounced at the farm every five weeks to ensure that a minimum of 10 tests per year are achieved. Each cow is identified and the amount of milk produced by her at evening and morning milkings measured and recorded. After sampling the milk the inspector stays on at the farm to perform butterfat tests for the entire herd. This procedure is changing somewhat in that milk samples from a number of the larger herds in many provinces are now tested at central provincial laboratories. In order for a producer to enroll in R.O.P. he must have a minimum of 20 cows, 15 of which must be purebred of one breed. Current fees are $9.00/cow/year.

The R.O.P. program is not extension and management oriented but some follow-up occurs in the case of low producing herds. Some of the more important records that are returned to the producer are:

- individual certificates of production
- annual herd summaries
- monthly barn sheets listing milk production and butterfat content
- semi-annual reports of sire appraisal

At the end of 1979 there were 4560 herds and 199,174 cows enrolled in R.O.P. across Canada with an average yield of 6177 kg. of milk and 236 kg. of fat for 305 day lactations. In Manitoba in 1981 there were 125 herds enrolled in R.O.P. with an average yield of 6376 kg. of milk and 231 kg. of fat per 305 day lactation.

Dairy Herd Improvement Programs

Every province with the exception of Newfoundland operates a DHI program that provides similar services to dairy farmers as does the R.O.P. These programs vary from province to province but all offer some type of management - extension information in addition to the basic milk yield and milk composition data.

In Manitoba the DHI program is administered centrally by the Animal Industry Branch but is operated locally by individual dairy herd improvement associations. These associations consist of from 3 to 30 dairy farmers with a minimum of 10 cows per herd and charge their members a fee varying from $7.00 - $12.00/cow/year. This fee is determined each year at the annual meeting of the association and reflects their cost of operating. The province provides a grant of about $5.60/cow/year to assist them with their operating costs. Each association employs a supervisor who visits each farm in the association at approximate 5 week intervals. Like the R.O.P.

inspector these supervisors identify each animal in the herd and record the milk yield for each at the evening and the morning milkings and take milk samples from each. These samples are shipped to the Manitoba Dairy Laboratory for composition analysis.

Additional central support is provided by the Animal Industry Branch in the form of milk testing services, supervision of associations, computer services and advice on herd management, breeding and nutrition. Further assistance is available to producers from a centrally located Dairy Cattle Specialist and from Livestock Specialists located in each of the five Agricultural Regions across the province.

In addition to the production and composition data (butterfat and protein) that is returned to the producer after each test a variety of management information is also provided. Some examples of this are:

- cow status (in milk, fresh heifer, dry, sold, nurse)
- recommended grain daily (kgs.)
- cow due to breed
- pregnancy check required
- due to dry
- lead feeding recommended
- due to calve
- lactation number
- days in milk
- days dry
- days in calf
- BCA fat and BCA milk
- deviation from herd average
- number of services
- cow not bred

In Manitoba there are two DHI programs, the regular program and the official program. The official program has essentially the same status as the R.O.P. in that all cows must be uniquely identified with a N.I.P. number or a registered cow number and the herds are tested by a second supervisor at least twice each year. Currently there are 264 herds enrolled in DHIA of which 48 are official. Approximately 11,500 cows are on test in the twenty associations now operating in the province.

Owner Sampler

Similar to DHI each province operates an owner sampler program which permits dairymen to weigh and sample milk from his own herd and send the weights and samples to a central facility.

In Manitoba the owner sampler program is administered by the Animal Industry Branch which provides the same central administrative, computer & testing services as

for the DHI program. Producers enrolled in this program receive the same production and management information as do the DHI members. The main difference between the two is that the individual cow records are not published and are not to be used at cattle sales as they do not originate from supervised herds.

Participants in this program receive 10 tests per year as do those on DHI but pay a fee of only $3.00 per cow per year for the service. Currently there are 104 herds enrolled in this program in Manitoba.

Achievements

Over the past few years there has been a growing interest in Milk Recording as producers come to realize that the added production efficiency that they promote is essential to survival in todays rather harsh economic climate. A brief review of the past 5 years,

	1977	1978	1979	1980	1981
Herds on Test					
R.O.P	134	133	129	109	125
DHIA	188	174	162	176	221
O/S	113	102	98	107	116
TOTAL	435	409	389	392	460
Cows on Test	17,483	16,771	17,502	18,957	21,418
Milk Production/Cow					
R.O.P.	5724 kg	5598 kg	5943 kg	6036 kg	6119 kg
DHIA	5320 kg	5520 kg	5700 kg	5833 kg	5829 kg
O/S	5100 kg	5162 kg	5368 kg	5344 kg	5425 kg
AVERAGE	5381 kg	5426 kg	5670 kg	5744 kg	5791 kg
Fat Production/Cow					
R.O.P.	209 kg	203 kg	217 kg	223 kg	227 kg
DHIA	184 kg	193 kg	194 kg	199 kg	198 kg
O/S	174 kg	178 kg	185 kg	185 kg	187 kg
AVERAGE	189 kg	191 kg	199 kg	202 kg	204 kg

indicates a consistent increase in enrollment and a gradual improvement in the production per cow parameters.

Currently there are 125 herds enrolled in R.O.P., 264 in DHIA and 104 in Owner Sampler for a total of 493. Additionally, we estimate that there are 22,200 cows currently on test. These figures represent 40% of the 1228 herds and 39% of the 57,000 milking cows in Manitoba. Thus we have experienced an overall increase of 13% in

enrollment in milk recording programs since 1977 and a 40% increase in DHIA.

If we try to relate these figures to actual milk production in Manitoba the advantages of milk recording programs are very obvious. In 1981 there were 265.6 million kgs of milk produced of which we estimate 124 million came from cows on milk recording. The balance, 141.6 million came from the 35,582 cows not on milk recording. This represents 3,979 kg per cow. How many cows could have been culled from these herds had they been on some form of milk recording?

In the future we can see a continued growth in milk recording enrollment providing the dollars are there to support them. These are very costly programs to run and will likely require more producer involvement if they are to be expanded. Additionally, it is likely that there will be fewer computerized programs as the provinces begin to share computer services in an attempt to cut costs and to provide more services to producers. Protein testing is now available and individual cow somatic cell counts are on the horizon. We now have more producer involvement in milk recording with the establishment of the Manitoba Milk Recording Committee. This committee is comprised of representatives from producers enrolled in the R.O.P., DHIA and Owner Sampler programs, administrative staff from Manitoba Agriculture and Agriculture Canada and from the Manitoba Milk Producers' Marketing Board.

In summary I think it is likely that we will see upwards of 60% of our herds enrolled over the next 3 - 4 years as the need for on-farm efficiencies grow. Hopefully, our ability to finance this type of expansion will expand at a sufficient rate to make this growth possible.

REFERENCES:

(1) Documentation: 2nd Annual National Milk Recording Conference

(2) Dairy Facts: Milk Recording in Manitoba, G.A. Harrop

(3) Annual Summaries: DHIA Manitoba 1977 - 1981

BEEF PERFORMANCE PROGRAMS

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The use of beef performance programs in Manitoba and Canada is running far behind those used for dairy and swine. This is not because good programs are not available - as a matter of fact, beef performance programs are some of the most advanced in the country and yet only a very small proportion of the total beef population is on any type of program. Every reason in the book has been given by beef producers not to use a program, but probably the most prevalent reason is the lack of handling facilities. Beef cattle are traditionally maintained in the "wild" fringe regions without easy access compared to dairy and swine which are intensively housed and as one would say "easily handled." Because of this close contact with the animals it is more evident to the breeder just how much milk a dairy cow produces or the number of piglets weaned from the litter. The beef man, on the other hand, does one evaluation on the beef cow each year at weaning. If she does a bad job this year, he tends to give her a second chance, then next year he forgets or forgives her performance from the year before. Very few beef farmers identify their cows or know their calves or any of the birth dates.

If the beef breeders in this Province were to apply their genetic parameters, great strides would be made in beef cattle improvement. Consider the fact that the heritability for growth rate is nearly double that for milk production. This means the beef breeder has potential to be far ahead of the dairy breeder, but unfortunately, the opposite situation exists.

In addressing the problem of what can be done to multiply the use of beef performance testing, let me first briefly outline the programs that are currently available in Manitoba. I will describe highlights of each program's developments, present status and future prospects. I will then summarize with some of concerns and suggestions for the increased use of beef programs.

At the present time there are four types of beef performance programs in Manitoba:

1. Herd Test Programs.
2. Bull Test Stations.
3. Progeny Proving Program.
4. National Sire Monitoring Program.

1. Herd Test Programs

Of all programs, the herd test programs are most widely used. Herd test programs available are:

a) Federal-Provincial ROP Program for Beef Cattle;
b) Breed Association Programs;
c) On-farm Computer Programs.

a) Federal-Provincial ROP has a long history in Manitoba starting first with the weighing of four herds in 1956. At that point it was a simple weaning

and yearling weight program. In 1971, the program was computerized and a data bank was initiated. There was some attempt at herd inventories and reproduction with gestation lengths but the emphasis was still on recording birth, weaning and yearling weights. In 1982, the program went under a complete revision with emphasis being placed on total herd management and not just weight recording. Although we are still very much experiencing growing pains with regard to the new program, I believe it is the most advanced beef program available in North America. Some of the up-to-date features of this program are estimated breeding values, scrotal circumferences, backfat thicknesses and hip height measurements.

Participation on the Federal-Provincial ROP Program is shown in Figure 1. In 1981, a record number of 18,997 weaning weights were recorded and for 1982 we hope to far exceed the 20,000 mark.

b) Breed Association Programs - At the present time, the Canadian Simmental, Hereford and Charolais Associations have breed programs in operation across Canada. All Simmental animals must have weights in order to be recorded or registered. Their program is strictly weight emphasized.

The Hereford (THE) and Charolais (CHARME) Programs are identical to the Federal-Provincial Programs but participants must pay a per head fee to use the programs.

All three programs submit their data to the National Sire Monitoring Program which definitely increases the accuracy and number of bulls proven.

c) On-farm Computer Systems - On-farm computers are not used to a great extent at the present time but I predict they hold great promise in the near future.

However, for the small commercial operator, nothing beats the speed of results of the simple hand calculator. The method is not as sophisticated as we would like, but if it gets the answers, it serves its purpose.

2. Bull Test Stations

Traditionally, there has been only the Manitoba Bull Test Station, but in the last three years, we have seen the development of five new testing facilities.

Figure 2 shows the number of bulls tested in Manitoba in recent years. Again, for the 1982-83 test period, a record of 842 bulls are on test. This increase in the number of bulls tested is no doubt the result of the success of the marketing of bulls through the Manitoba Bull Test Station.

We all know the benefits of identifying superior bulls and offering them to the industry, but it is difficult to convince breeders to send bull calves to test stations unless there is an economic benefit involved.

3. Progeny Proving Program (The Triple P Program)

The Triple P Program has been in operation since 1976 with approximately 1,200 cows enrolled in each of the past two years. The major drawback to the program is the limited use of artificial insemination.

FIGURE 1. PARTICIPATION ON THE FEDERAL-PROVINCIAL ROP PROGRAM

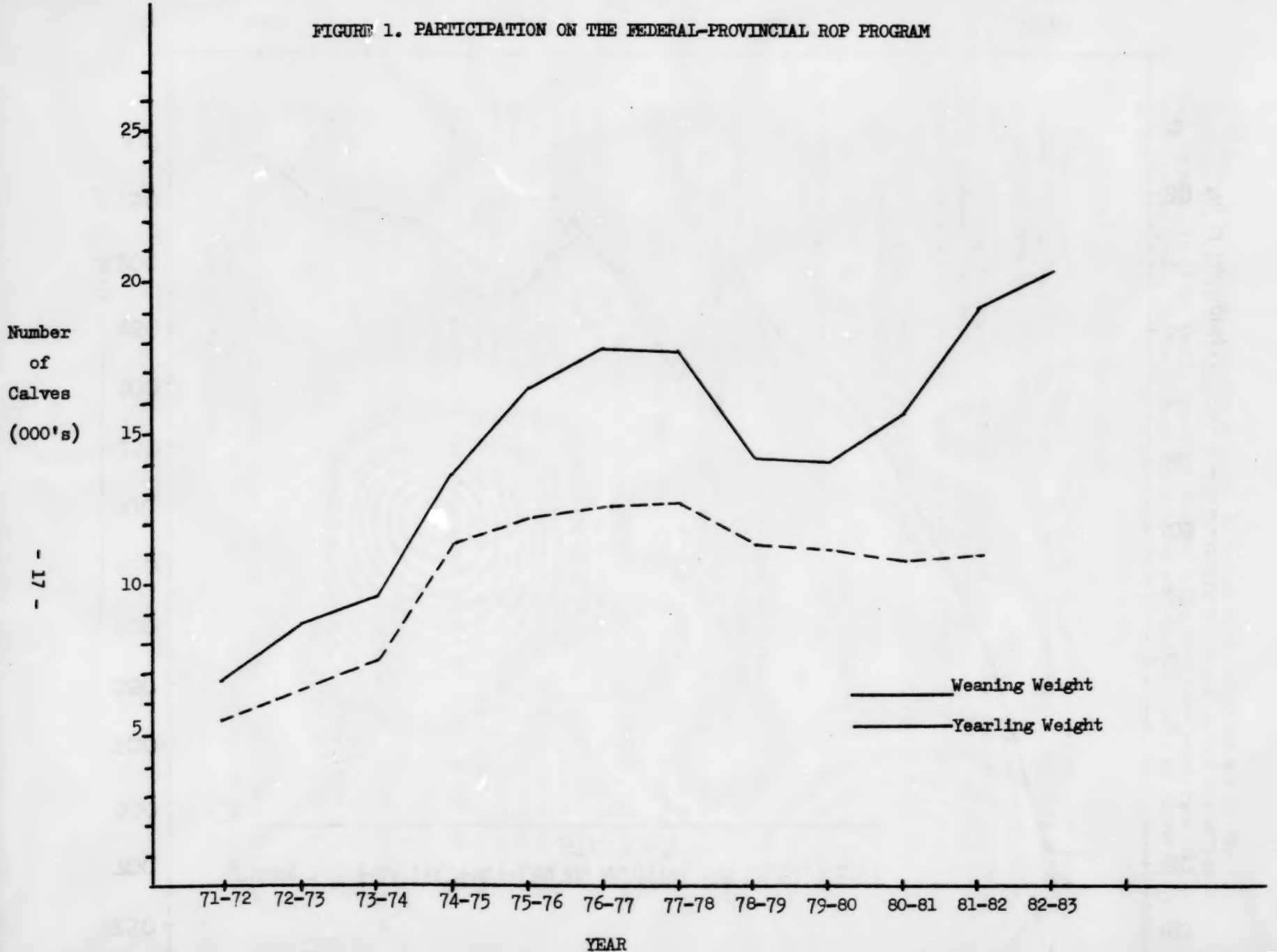
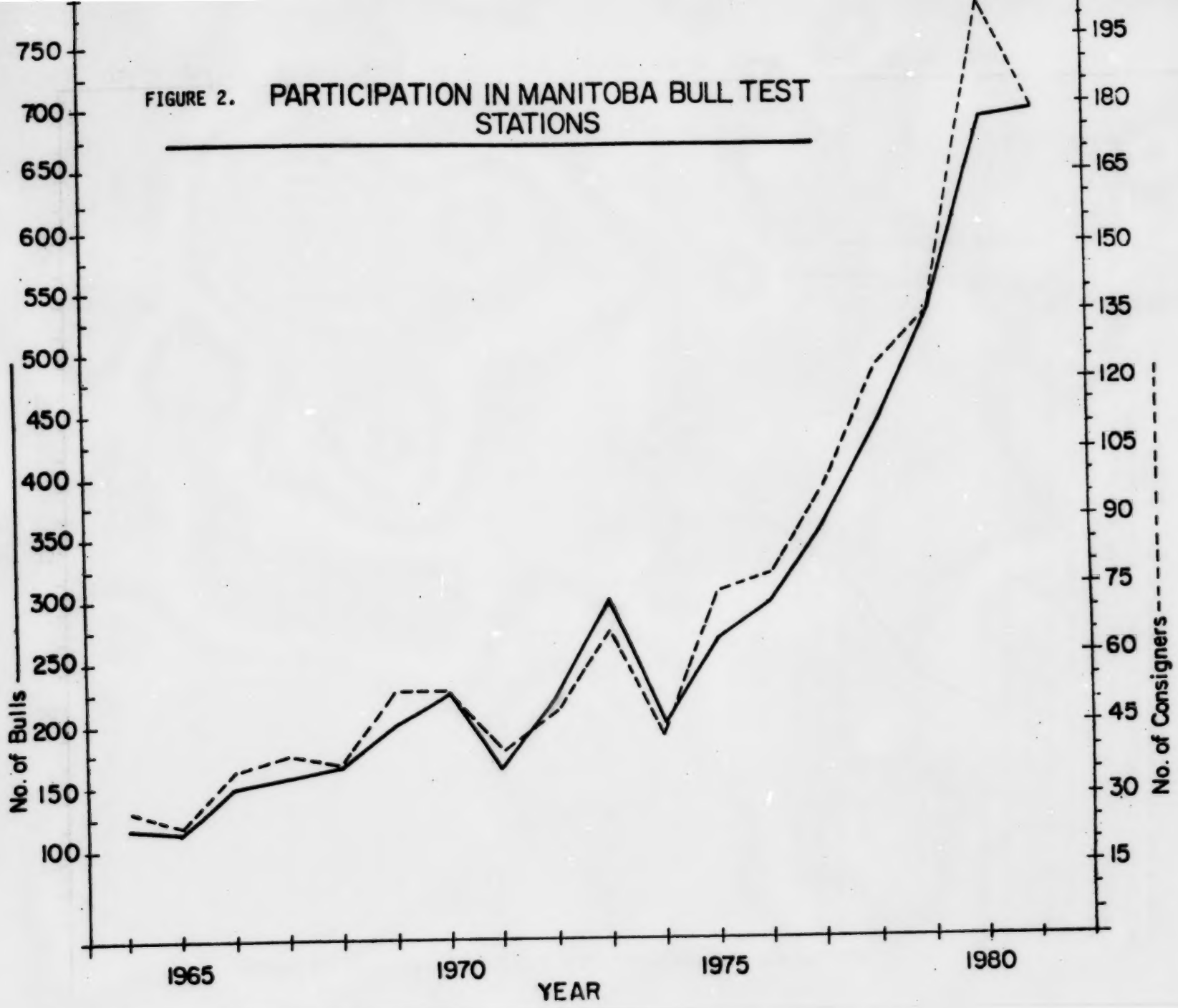


FIGURE 2. PARTICIPATION IN MANITOBA BULL TEST STATIONS



Most other progeny proving programs in Canada have faultered due to the expenses involved to bull owners. Although Triple P has not scored attractive big numbers, it is presently growing. Several bulls have been identified as superior for growth traits through the program and many more will be proven in the near future.

4. National Sire Monitoring Program

The program is the only one of its kind in the world evaluating such large numbers from so many different breeds. As mentioned previously, the data used is from the home test programs.

The yearly listing of sire proofs should be used more extensively than it is at present. Currently, it is used more to enforce a producer's feelings about a certain bull than when actually planning a breeding program.

There is also a need for more young sires to appear on the listings for faster generation turnaround.

Finally, I would like to express some concerns regarding the present beef performance testing programs and suggest some possible ways in which they may be improved.

First, we have to change the idea that beef performance testing is for measuring weight gains but rather for total herd management. We are fortunate in the beef business to have many breeds of cattle with a wide genetic variation for growth and milk production. Unfortunately, all breeds tend to select for the same traits. Our direction is to get beef breeders crossbreeding and taking advantage of breeds which complement each other for economically important traits.

Second, we need a marketing system which will feed back signals to the beef breeder which will in turn aid in making selection decisions. In the dairy business, returns are based on the quantity of milk and butterfat, and in the hog business, higher returns are known to be consistent with a constant weight, lean market animal. In other words, market demands have told the dairy and hog breeder what to select. In the beef business, there is very little feedback and consistence. For example, one year the market is after light straightbred British breed calves, then the next year heavier Exotic-cross calves. With the finished animal, the buyers are demanding light carcasses at one point and a week later, heavier carcasses.

Last, I want to make the comment that we have to start changing our attitude that beef production is secondary to other farming enterprises. In the majority of establishments the beef cow is not the money maker but rather the nuisance that "keeps the weeds down." Until we change that attitude, beef producers are not going to think seriously about their breeding programs or improving their overall efficiency.

In summary, I feel beef performance testing is going to increase substantially in the coming years, but it is up to all of us to continue our push on promotion and use of the programs.

SWINE PERFORMANCE TESTING

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The amount of genetic improvement obtained from the selection process depends on the heritabilities of the traits under selection, the percentage of the population selected to produce the next generation (selection differential), and the average age of the parents when their first offspring are produced (generation interval). Swine have the advantage over other common farm livestock of being highly prolific as well as producing offspring at a relatively young age. This allows intense selection and a rapid turnover of each generation, under practical production circumstances, resulting in relatively rapid progress.

Examples of progress made by the swine industry are readily seen in some traits of economic importance. Average backfat thickness, for example, has decreased significantly over the past few years. In Manitoba, the percentage of market hogs indexing 102 or better is eight points higher in 1982 than the 1977 average. Statistics published by the U.S. National Pork Producers' Council show an increase of 35 pounds of retail meat per hog over the period of 1950 to 1980. Although the genetic contribution to these improvements cannot be quantified, it is highly improbable that they could have been achieved without an improved genetic potential for leanness.

Selection efforts in swine have emphasized the improvement of carcass and production traits. Some of the more common traits under selection include carcass lean content, carcass length, loin eye area, and postweaning growth rate and feed conversion ratio. Although litter size is perhaps the most important economic trait in swine production, its low heritability has discouraged selection as a means for its improvement. Carcass length and meat quality have received more attention in European selection programs than those in North America, reflecting the greater reliance of European countries on export markets. Traits receiving the greatest emphasis in Canada have been carcass lean content, growth rate, and feed conversion ratio.

Past Testing Activities

The majority of swine testing activities in Canada have occurred under what is now called the Federal-Provincial Swine Record of Performance (ROP) Program. This nationally-uniform testing program stems from an advisory body that was established in 1928 to develop uniform testing procedures for Canadian swine. Their efforts resulted in the building of several central testing stations, the first of which was completed in 1935.

The first type of testing carried out at the stations was the sow progeny test, which was patterned after the Danish sow-litter test. Littermates submitted to the stations were slaughtered upon completion of test, and the results were used to identify those sows producing offspring of superior carcass merit and production ability. Progeny testing continued to be the main form of testing until the late 1960's.

Two major developments caused the ROP program to move away from the progeny test. The first was research which indicated that more rapid progress could be made in many production and carcass traits when selection was based on the test animal's own performance (performance test) versus that of its offspring (progeny test). This was especially significant when it became apparent that insufficient testing resources were available to supply the seedstock needs of the total industry.

The second factor was the development of a testing technique for measuring carcass leanness which could be used on a live animal. Researchers had shown that a highly favorable relationship existed between backfat thickness and the percentage of lean meat in the carcass. Initially, thicknesses were measured by a ruler inserted in incisions made in the animal's back. The adoption of ultrasonics in the early 1970's, however, provided the real stimulus for changing the emphasis from a progeny testing to a performance testing program. Ultrasonics also stimulated the development of on-farm testing, resulting in a dramatic expansion in numbers tested.

Present Testing Activities

The two main traits evaluated by the ROP program are average backfat thickness and growth rate. Loin eye area was evaluated until the mid 1970's, when it was determined that it could not be accurately measured by ultrasound. Feed conversion ratio was a selection criteria until 1982 but was dropped because evidence indicated that indirect selection through growth rate was just as effective as direct selection for the trait itself.

The program consists of two parts. Home-testing, which accounted for 97 percent of all testing in 1981, is conducted on the farm. Station-testing is conducted at eight stations located throughout Canada. The Manitoba station is at the Agriculture Canada Experimental Station in Brandon.

Home testing is conducted free of charge and is available to seedstock producers who meet the following criteria:

- Own and maintain a breeding herd of identifiable ancestry.
- Identify legibly all breeding animals in the herd.
- Maintain complete breeding and management records of the herd.

Boars and gilts weighing between 75 and 105 kg are weighed and probed for backfat thickness by personnel from Agriculture Canada or Manitoba Agriculture, who visit the herd upon request. Backfat thickness is expressed as the average of four ultrasonic measurements taken at the midback and loin, five centimetres off the midline on each side. It is adjusted to a standard 90 kg liveweight to allow between-animal comparisons. Growth rate, expressed as the age of the animal is also adjusted to 90 kg. If a minimum of 20 pigs of the same breed and sex have been tested in the herd over the past 12 months, a selection index is calculated on each subsequent test animal. The index combines the backfat and age values into a single composite score which compares an animal's genetic worth with the average performance achieved over the past 12 months. Producers enrolled on the home test program receive a copy of the adjusted performance data at the time their animals are tested. Reports which summarize performance by sire are also issued every three months. Performance comparisons among home tested animals are only valid within the same herd.

Station testing is conducted by Agriculture Canada and enables valid comparisons on the genetic worth of pigs originating from different herds. Breeders using the home test program receive first priority in submitting test animals to the station. Participating herds must be actively enrolled in a recognized herd health program and declared free from clinical signs of contagious disease.

The Brandon station is divided into two sections and each section has the capacity to test 64 boars every four months. A total of six test periods are scheduled annually, with a new period beginning every second month. Boars are delivered to the test barn when they weigh between 18 and 30 kg and are penned according to sire (maximum of four per pen). They start test when the pen average weight reaches 30 kg. During the test period a 16 percent crude protein barley-soybean ration is fed ad libitum. The test ends 14 weeks later, or when the average weight of the penmates reaches 90 kg. At this time, average backfat thickness, average daily gain, and average feed conversion ratio are determined for each boar. A selection index is calculated by comparing the individual's backfat and growth rate values to the averages achieved by the breed over the past 12 months. All boars indexing 95 or less are automatically culled while boars indexing 100 or better may be offered for sale.

Each breeder receives a performance report when the animals have completed test. When at least eight boars from a sire (two littermates from a minimum of four sows) have been tested, the data are also used to produce a sire evaluation report, which provides a basis for comparing the breeding values of different herd sires.

Future Directions and Concerns

As illustrated by Figure 1 and Tables 1-3, significant progress has been made in reducing backfat thickness over the past five years. Unfortunately, the same trend does not apply to growth rate and feed conversion ratio. Although station-tested boars have consistently grown faster than those on home test, there has been virtually no improvement in growth rate in either group. The ROP program recently adopted a new selection index formula which places increased weighting on growth rate.

Concern for meat quality has recently developed and centres on the PSE (pale, soft, exudative) pork syndrome. This condition is often connected to lean, heavily-muscled pigs and there is some question regarding an unfavorable relationship between low backfat thickness and a predisposition to this condition. The halothane test has been of limited success in identifying pigs which carry the genes contributing to PSE pork, and is being instituted at all test stations in 1983. All halothane reactors and their littermates will be culled upon completion of test.

Sow productivity is another area which is currently being addressed by the ROP program. This aspect focuses on the identification of females within the breeding herd who are superior in prolificacy and mothering ability. The eventual aim is to improve female reproductive traits through selection based on a productivity index which combines the traits of litter size at birth and litter weaning weight. This program is presently in the trial stage, but should be operational within the next two years.

A trend which is becoming increasingly apparent, especially in Western Canada, is the takeover of the swine seedstock industry by breeding companies. Most of these companies employ professional geneticists and thus run their own performance testing programs. Their share of the market is presently large enough that they cannot be ignored as a major force in the seedstock industry. The Swine ROP Program must take this development into account when developing future policies, if it is to maintain an effective national testing program. Future efforts may need to be directed at providing unbiased evaluations of the various breeding company products available, similar to tests currently conducted in several European countries.

Figure 1. Average adjusted backfat of ROP tested swine 1973-81.

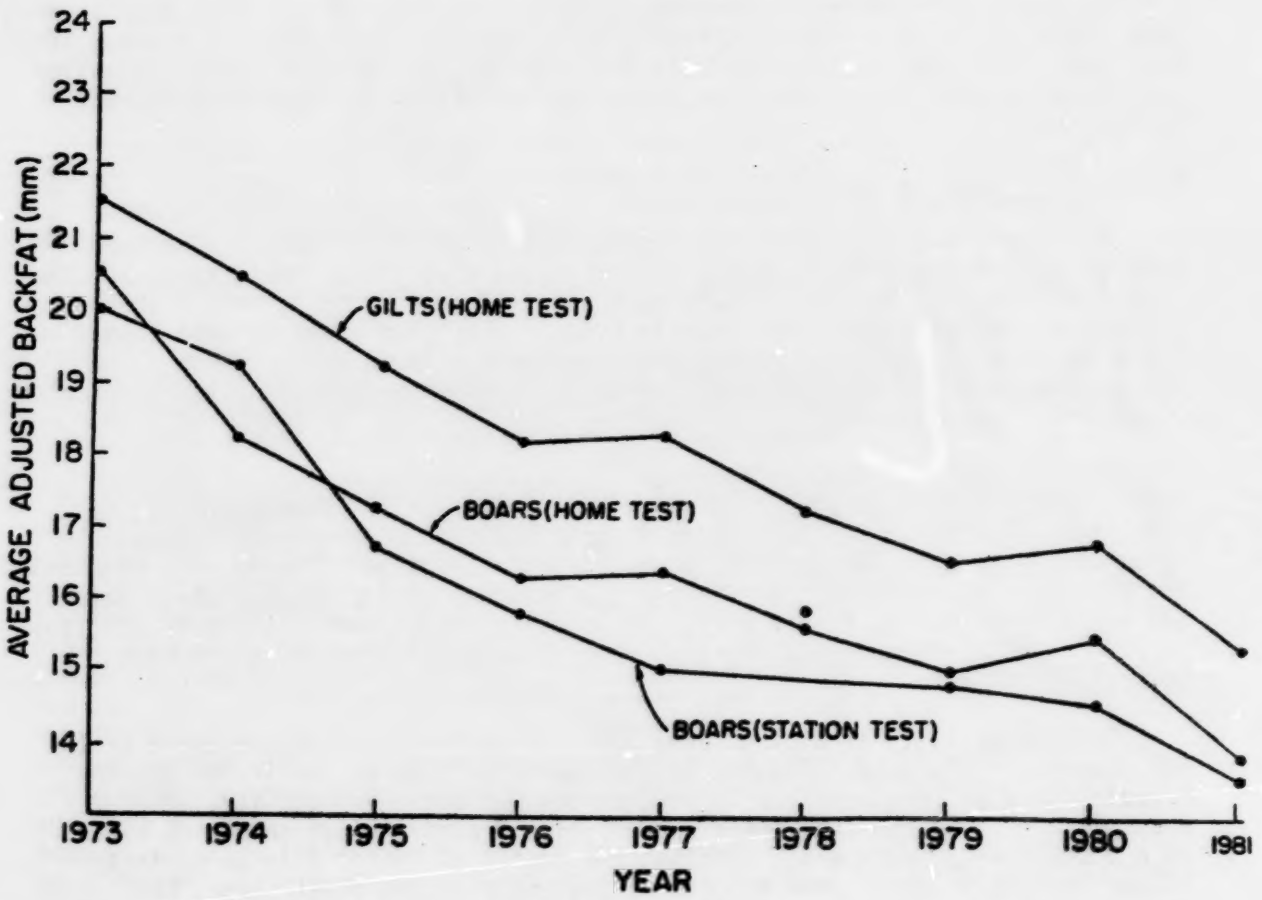

Table 1. Summary of station-tested boars, 1977-1981

Year	Number Tested	Average Backfat Adjusted to 90 kg (mm)	Average Daily Gain (kg/day)	Average Feed Conversion (kg feed/kg liveweight gain)
1977	392	15.2	0.85	2.54
1978	290	16.0	0.86	2.67
1979	351	15.0	0.86	2.51
1980	321	14.8	0.87	2.48
1981	309	13.8	0.87	2.53

Table 2. Summary of home-tested boars, 1977-1981.

Year	Number Tested	Average Backfat Adjusted to 90 kg (mm)	Average Age Adjusted to 90 kg (days)
1977	1413	16.5	171.3
1978	1428	15.8	169.0
1979	1708	15.2	171.3
1980	1735	15.7	172.9
1981	1496	13.5	169.2

Table 3. Summary of home-tested gilts, 1977-1981.

Year	Number Tested	Average Backfat Adjusted to 90 kg (mm)	Average Age Adjusted to 90 kg (days)
1977	2890	18.4	179.4
1978	2592	17.4	178.0
1979	2518	16.7	177.1
1980	2826	17.0	182.6
1981	2812	15.2	181.5

MANITOBA'S HERD HEALTH PROGRAMS

In most livestock operations losses from sickness and obvious disease are small compared to losses of production that result from subclinical disease, poor nutrition, low pregnancy rates, high infant mortality and poor feed efficiency. In highly productive herds profits can be increased by reducing high feed costs and coordinating various management practices to make better use of labour.

Maintaining animal health and controlling disease requires an ongoing program of management practices. Instead of being a disjointed program of individual procedures, it should be a well planned, coordinated program tailored to suit the particular enterprise. It should be reviewed regularly and modified to meet changing conditions. In planning and carrying out such a program maximum use should be made of the services of a practicing veterinarian.

By keeping an eye on the livestock enterprise in a series of regular visits a veterinarian can anticipate potential problems and suggest ways to prevent them. The number of visits required will depend on the type of livestock enterprise, the suitability to seasonal or cyclical operations, degree of confinement, managerial expertise and the degree to which management wishes to become involved in animal health procedures.

Some of the benefits to be obtained from a herd health program are:

- Increased breeding efficiency;
- Best utilization of feeds;
- Proper and most economical use of drugs;
- Minimal death losses.

This presentation will attempt to describe the types of herd health programs presently being conducted by practising veterinarians in Manitoba and will be concluded by a few comments about the extent to which livestock producers and veterinarians are realizing the potential benefits obtainable from such programs.

Of 31 rural veterinary practices recently surveyed, seven do not conduct any herd health programs. As might be expected, all seven are single person practices where the veterinarian's time is usually fully taken up responding to calls that arise from situations that require unexpected and near immediate attention. Most of these practitioners have an overall disease prevention program for some of their clients, involving such things as routine vaccination recommendations and general advice on sanitation and disease control, but they were reluctant to call such counselling herd health programming since it lacks what most people consider an essential part of a herd health program - namely, the regularity of periodic visits to the herd.

Of the 24 practices that do conduct herd health programs, 21 have programs for dairy cattle, 7 have programs for beef cattle, 12 have swine programs and 3 conduct equine herd health programs.

A feature common to all the programs is that they are initiated, maintained or discontinued by verbal agreement only. No written contracts are involved.

With few exceptions, fees are based on an hourly charge for the time spent by the veterinarian during the herd visit, plus mileage and the cost of drugs used. Two practices charge on a per head basis, billing for each procedure performed on an individual animal. The hourly rate varies from $30 to $45. Some veterinarians attempt to visit 2 or more herds in contiguous succession and reduce the mileage costs by splitting them between the number of herds visited.

The length of time programs have been continuously conducted varies from a few months to 7 years.

Dairy Programs

As previously mentioned, most of the herd health programs in Manitoba involve dairy herds. There is a great variation in the degree of services offered (or demanded) in these programs. Some consist only of a constant monitoring of the reproductive status of the herd. A few others encompass counselling on nutrition,

mastitis control, calf management including castration and dehorning, feet care and overseeing a general disease program which includes parasite control and vaccination schedules.

The reproduction component of the herd health programs appears to be standard in all the programs and consists of examining:

- those cows fresh 50 days or more but not yet in heat;
- cows calved since last visit;
- cows bred more than 3 times but not yet in calf;
- pregnancy check all cows 35-60 days after breeding;
- cows showing irregular heat cycles or abnormal discharges;
- all cows 30 days after calving to see if they are ready to breed on next heat or 50 days after calving.

Most visits are made monthly or every six weeks. A few are visited every 2 weeks and in one herd a regular weekly visit is made. This latter herd is one of the few herds where a definite regular day for the visit was adhered to. With few exceptions, the veterinarian has visited the farm every Tuesday for the last 3 years.

On the latter mentioned farm the regular visit consists almost entirely of checking the reproductive status of the herd. No regular mastitis control program is followed but the veterinarian works closely with the Dairy Division of Animal Industry, monitoring particularly the somatic cell counts made regularly by the division. The average production of the herd is 15,000 - 16,000 lbs. yearly. There are 130 cows in the milking line. All records are kept by the owner and maximum use is made of the standard DHI charts.

Another clinic offers a more comprehensive program involving reproduction checks, mastitis control including milk equipment checking and calf rearing management. Visits are scheduled for a specific day each month and are usually confirmed the evening before. The mastitis control program consists of quarter

sampling each cow yearly, utilizing CMT and culture and sensitivity tests to select the most appropriate preparation to be used for dry cow treatment and mastitis control during lactation. Nutrition counselling consists of making sure all forages and grains are sent to the provincial feed lab for testing and the ration recommendations that accompany the test results usualy form the basis of the feeding programs. This is the only farm surveyed where the veterinarian maintains records himself. A sample of the records kept is shown here.

Another clinic conducts a comprehensive program that,in addition to those program components already mentioned, includes routine examination and careof feet and legs, utilizing a mobile foot-trimming table. Quarter sampling is done annually by the Dairy Division and all quarters are dry treated. All dead cattle are postmortemed.

In the latter practice, no definite dates are set for visits. The appropriate components of the program are carried out whenever a call is made in response to a request for veterinary service. In most herds this means that visits are made at least once a month and often more frequently. This practice has 35 such herds on such a program, including the two top producing herds in the province. There are approximately dairy herds on herd health programs in the province.

With one exception, veterinarians insist that the responsibility for maintaining accurate records rests with the herd owner since few owners are willing to pay for the time veterinarians take in doing so.

In most programs the date of the regular visit is determined by the herd owner, who chooses a date most convenient for his operation at that time. In such programs the owner usually determines what services are performed by the veterinarian and such services are often limited to reproductive tract examinations. A few veterinarians insist on doing whatever they think is necessary and adhering to a previously outlined schedule of procedures.

Some veterinarians conducting herd health programs utilize and appreciate the help of other resource personnel, particularly the Dairy Division of the Animal Industry Branch in the matter of mastitis control. Veterinarians are unanimous in their opinion that herd health programming is made easier and more noticeable benefits were obtained from the programs in those herds enrolled in the Dairy Herd Improvement Program.

Swine

Twelve veterinary practices are involved in swine herd health programs. The number of visits vary from 2 to 12 per year. Visits are usually made at a time determined by the herd owner and seldom regularly occur on a specific day of the month. Most visits consist of a discussion of the problems indicated by an analysis of the performance records, plus an examination of the animals and the facilities. Such discussions and examinations usually involve the factors outlined in the form that was used in the swine herd health program that was sponsored until recently by the Veterinary Services Branch of the provincial government and is illustrated here. Vaccination and parasite control programs are developed to suit the particular herd. Routine fecal examinations are a part of many programs.

In the programs of 3 practices the postmorteming of all dead pigs is considered to be an essential factor in monitoring the effectiveness of the disease control component of the herd health program.

In one practice, feeder barns are visited 3 times a year and farrow to finish operations are visited every 60 days. All prospective stock purchases are blood tested and the titres of various diseases present are compared with those present in the owner's herd before such purchases are recommended. There are 25 herds on such a program, 18 of which are Hutterite Colony herds.

Some programs include periodic slaughter checks for atrophic rhinitis and pneumonia and in others slaughter checks are

confined to one each spring and fall to monitor summer and winter disease patterns. In the few more comprehensive programs, analysis of a more detailed set of records, such as shown here, is considered necessary in optimizing production, especially when current records are compared to predetermined production objectives and recent past performances.

Beef

While most veterinarians routinely do pregnancy testing and bull evaluations for their cow-calf clients each spring and fall, only seven thought of such activities as constituting a herd health program.

Of those that did, only 4 used such occasions to encourage the keeping and analysis of records whereby such herd performance indices as per cent calf crop, calving frequency or killogram/pounds of calf weaned per breeding female exposed to the bull could be used as a basis for a meaningful herd health program. The regular analysis of such records, even though done only twice yearly would greatly improve the productivity and profitability of most herds as well as monitoring the effectiveness of a disease control program.

Apparently only one veterinary practice in the province provides a herd health program for feedlots. Approximately 35,000 head are supervised under the program which consists of an assessment of the health status of all incoming cattle, recommended vaccination procedures and treatment regimes, the postmorteming of all dead animals and an examination of all animals and facilities wherever a call is made. The veterinarian concerned in this program feels strongly that it is in feedlot preventive medicine that herd health programs have most to offer the producer as regards cutting expenses and increasing profits. Such benefits especially accrue from reduced death losses and savings in drug costs. In one feedlot on the program the average death loss over the last five years has been 0.38% and total drug costs per head have been $6.90 compared to the commonly accepted average of $13.00 per head.

Equine

Three practices in Manitoba conduct ongoing herd health programs for horses. In one practice preventive medicine programs account for 75% of the practice work.

Most programs involve 2 or 3 visits per year for routine deworming, teeth care, pregnancy checking and prebreeding examinations. Vaccination schedules are developed and regularly updated and sanitation and disease control practices monitored.

One practice, confined to equine work and involved with race horses and breeding establishments, visits many stables once a week and at certain times of the year, such as the breeding season, every day.

Facts and figures to support the claims of benefits obtained from herd health programs have been gathered and reported in other places. Unfortunately no such information has been collected in Manitoba.

Herd health programming is catching on in Manitoba. More is being done than was suspected when this presentation was initiated. However, much more remains to be done, particularly in the beef industry. Veterinarians should seize the opportunity afforded them by fall pregnancy examinations and spring bull evaluations to expand such activities into meaningful programs that will not only involve disease control but will increase production through the recording and analyzing of herd indices that are checked annually against production objectives and past performances.

The potential for veterinary contribution in maximizing profits through lower death losses and reduced drug costs in Manitoba feedlots is largely untapped.

While most progress in herd health programming has been made in the dairy sector, many producers and veterinarians could increase the usefulness of their programs by expanding them to include more than just a routine check of the reproductive status of the herd.

The apparent unawareness of both producers and veterinarians of the potential benefits of herd health programs on most PMU farms is to be regretted.

Herd health programs are not for every producer and veterinarian. If a producer is not satisfied with the services and programs of one veterinarian, he should try another. Likewise, a veterinarian should not let his frustrations arising from attempting to work with an uncooperative producer destroy his interest and participation in herd health programs. For herd health programs to be effective four essential requirements must be met:

1. The producer must be willing to achieve optimum production through efficient management and disease control.

2. The producer must be willing to provide positive identification and keep necessary records.

3. The veterinarian must be willing to become keenly interested in the efficient management and disease control of the herd.

Finally, in the matter of herd health programming, the veterinarian should be regarded as a member of the livestock production team. Maximum benefits from such programs can only be obtained when both producer and veterinarian realize their limitations in certain fields and fully recognize and use the expertise of other agricultural resource personnel such as nutritionists, livestock specialists, geneticists, engineers and economists.

F.P.Baker,D.V.M.,
Chief Field Veterinarian
Veterinary Services Branch
December 6, 1982

I should like to thank the many veterinarians who gave willingly of their time to explain their programs to me. Without such help this presentation would not be possible. F.P.B.

Presentation to the Animal Industry
Conference, University of Manitoba
December 14, 1982

- H. D. McRorie
Vice President, Agricultural Services
The Royal Bank of Canada

THE BANKER'S ROLE IN FINANCING THE LIVESTOCK INDUSTRY

My assignment this afternoon is to look at the role of banks in financing the livestock industry. In addressing this subject, however, I should point out that while some of our security requirements and specific financing terms do change with the type of farming involved, for the most part, we try to set up programs that are general enough to apply across the board.

I would like to address basically four issues. First, what are the specific needs of the livestock industry. Second, how well are banks meeting these needs. Third, what are some of the emerging problems and fourth what is likely to be the banks' approach to meeting these problems.

What are the Needs?

What are the specific needs of the livestock producer insofar as credit is involved? What should be expected from a lender? I'll list a few of what I think are the more important issues. Those of you who are in a borrowing position can probably add a few more:

1. A flexible line of operating credit - preferably of a revolving nature. I think that the days of the operating loan taken out in the spring and repaid in the fall are long gone - certainly for most types of livestock producers. What is needed now is an operating loan that can grow to meet cash operating needs as required during the year, yet be repaid as cash flow permits in order to minimize interest charges. There are problems with revolving operating loans - mainly in determining the upper limit required and in controlling repayment. What it usually boils down to is a need for a lot more financial planning when setting up the loans - including use of a cash flow projection.

2. Lines-of-credit on an annual basis for purchase of fixed assets such as land, buildings, machinery, breeding stock. Arranging for financing on a piece meal basis throughout the year may have been the way to go a few years ago. Today, however, I think that most producers would like to arrange their total expected credit needs at the start of each year, knowing that those funds would then be available during the year as needed. This method of financing also makes it much easier to match income against projected debt servicing requirements - a vital point in today's difficult economic environment.

3. Credit commitments to cover longer range expansion plans. If you're in the process of building up a breeding herd, you'll need to look at your credit needs several years down the road

and have some assurance that your lender is willing to stay in step with these needs. That means planning well ahead and keeping your banker advised as to these longer range plans. Nothing can be so traumatic as suddenly discovering that your longer range development plans are likely to be scuttled simply because you've failed to keep your lender in the picture and convince him that he, too, had a stake in this plan.

4. Assurance of back-up financing and flexible repayment options during tough economic times. Agriculture is a highly cyclical business - something that we as lenders sometimes forget. If you have a reasonable degree of equity, you can usually get through these periods without a great deal of difficulty. But you'll probably need additional debt consolidation loans and loan restructuring in order to keep your business on an even keel. We're looking at just such a period today.

5. Financial management support. No question about it! If you don't have a close grip on your day to day financial affairs, you're likely in for a tough battle. As a borrower, you have a need, and I think a right, to expect that the lender is able to provide you with at least some degree of assistance in helping you cope with your day to day financial management. That might mean anything from the provision of financial planning forms to having a cash flow accounting system available for your use. Frankly, I think that you're doing yourself a disservice if you don't avail yourself to all the

planning aids you can get your hands on, and I submit that the lender is also doing you a disservice if he doesn't insist that you take a firm grip on your financial management affairs.

6. Support for the agri-business infrastructure. You might wonder why I bring up this point. The reason is straight forward. You can't run your business successfully unless you can be assured of having a wide range of suppliers who can meet your operating needs on a consistent and dependable basis. What it invariably boils down to, is that the agri-business community also requires credit in a manner not unlike your own needs. The farm lender needs to look at the broader picture and ensure that he is also providing the credit necessary for your supplier to handle your own needs as a customer. Pinch off that supply of credit, and the basic producer suffers as well.

7. Fixed rate lending. I almost hesitate to bring up this point, but if I don't, you probably will. I've been told on many occasions that one of the livestock producer's prime needs is some assurance of the extent of future debt commitments. Frankly, I have some troubles with that viewpoint in today's economic environment, but let me reserve my comments on that subject for the moment.

There are probably many other specific credit needs that may come to mind, but it seems to me that I've covered at least

the major items. In short, as a borrower, you need the type of lending institution that can tailor a loan package to your own specific needs, an agency who will be with you during tough times as well as good times, and one which can provide you with at least some degree of guidance and financial management support when the going gets rough. Personally, I don't think that this is asking too much of any agency that considers itself to be in the business of farm lending.

What Are the Banks Doing to Meet These Needs?

So much for what is needed! Now let's take a look at just how well the banks are meeting these needs. I'll admit to a degree of bias in what I have to say next, but I'll try to be as objective as possible.

First, operating credit! In my judgment , fully revolving lines of operating credit are now available from all the major lenders. If you haven't been able to secure this type of loan and feel you need it, perhaps it's time to look elsewhere for support. By and large, revolving operating lines are now well established and if there is one single problem that needs to be addressed, it's the matter of "locked-in" operating advances. Normally, we like to see operating loans very closely tied to actual operating capital requirements. Quite frequently, however, we find borrowers using their operating line to acquire capital items such as a new tractor.

That invariably means that a loan extension is required to the operating line in order to service new operating expenses. When that happens, the operating line becomes much larger than it should be, and bears little relationship to the actual cost of inputs. You might ask what is the problem - the banks still get their interest. In my mind, the problem is two-fold. First, we may not be secured as well as we would like to be on the added amount. Second, but most importantly, the debt servicing capacity of the farm is distorted. That happens simply because in practice, we only take into account the interest on operating loans when determining debt serviceability - the principal is assumed to be rolled over to the next year. When you start rolling over capital items, however, then you're not making allowance for the principal repayment that should be made each year on these items. As a result, you overstate the farm's ability to service the debt.

Line-of-credit loans covering short and intermediate term needs is probably working quite well at this time and is certainly available from all major lenders. There is probably still some room for innovation and fine tuning. For instance, we could look at a form of revolving loan for depreciable assets such as machinery. This would allow a farmer to draw down his authorized machinery loan account as needed to meet specific replacements, repaying a fixed percentage of the loan each year. In effect, this would become his depreciation account and would allow for a more orderly and planned replacement of machinery.

Longer range credit commitments is an area where I think the banks still have considerable room for improvement. By and large, we still evaluate and confirm our credit lines for terms of one year or less. A cow-calf producer seeking to expand his herd needs some assurance today that credit will be available two and three years down the road. What this all means is that borrowers should probably be submitting longer range operating and capital plans - perhaps looking ahead 4 or 5 years where a major expansion is involved. Lenders would then have a chance to decide early in the game whether or not they wanted to be part of the action. Presumably, if in agreement, they could then give some degree of assurance that future credit needs would be met, subject only to yearly progress of results against plan.

Financial back-up assistance during periods of economic downturn? Well, I think that the jury is still out on that one. There is certainly a school of thought today that accuses the banks of selling their clients short and recovering loans through foreclosure. There's probably an element of truth in at least some of these accusations. But when I look at the extent of debt consolidation loans that we've provided in our own shop, I can't help but think that we're trying pretty hard to stay with our clients and meet our responsibilities as a lender. In many cases, we're talking about a judgment call, but by and large, I would say that subject to 3 conditions, the banks today are standing behind their farm clients, despite what some vigilante groups may say. Those 3 conditions? Well, I think most banks will move quickly on

foreclosure procedures where there is good evidence of fraudulent activity on behalf of the borrower, where the borrower no longer has any equity left in the operation, or where in the opinion of the bank, there is simply no hope of financial recovery and a strong feeling that foreclosure now will reduce what will be even greater losses in the future. I know that a lot of attention is being paid to farm bankruptcy figures, but let's keep this in perspective. Last year in Canada we had 261 farm bankruptices. This is a 17.5 percent increase over the preceding year. This year (January - October) we've had 344 farm bankruptcies. But I suggest to you that these figures pale by comparison when you look at the 8,000 plus bankruptcies that took place last year in the small business sector - a group with perhaps only twice the number of businesses that we have in the farm sector.

Financial management support from the banks, is on the upswing, but in my view, is still less than satisfactory. Clearly, we need to provide borrowers with better analytical tools and we probably need to also sharpen up our own credit assessment procedures. Changes are coming, however, and I think that we'll see a lot more as banks move more into computer technology for loan assessment and farm financial planning. In our shop, we're now testing computerized procedures for both farm planning and credit assessment. We expect to go a lot further in the near future. Currently, we provide our clients with a cash flow accounting system called Farmchek. This system utilizes coded cheques and receipts to capture detailed cost

and income data on a monthly and accumulated monthly basis. We're now looking at expanding that system to also include the type of financial planning component required for credit application. In a nutshell, we've made progress in this area - but there is a strong need for much more action in the future.

As far as financial support for the agri-business sector is concerned, I think that we have a reasonable record, but again, room for improvement. For one thing, I think that banks are still too prone to withdraw credit from high risk farm clients and thus force them to obtain trade credit. In all fairness to the trade, we probably abdicate our responsibility in these cases without relinquishing our claim on security under Section 178 of the Bank Act. I think that there is room for much more dialogue and communication with the trade on this subject.

How well have the banks met the needs of the livestock producer? Still room for improvement, I would suggest, but we're moving in the right direction. Much more emphasis and concern for financial management on behalf of the borrower can't help but accelerate the needed adjustments.

Some Problem Areas - Now and in the Future

In the short time that I have left, I would like to touch briefly on a few items that concern me at this particular point in

time. Let me hasten to mention that in bringing up these points, I'm not suggesting that they are any more relevant to livestock producers than any other producer.

Recovery of loan security. I'm sure that you're all aware that there have been a number of instances recently where a group of farmers have succeeded in preventing banks from recovering their loan security. Let me make the point that collateral security is still very much a condition of lending. Take away the lender's ability to realize on this security when required, and you will effectively remove the lender from any future lending activity of that type. While one may be tempted to applaud the efforts of a few farmers to frustrate the loan recovery efforts of the big bad financial institutions, don't forget that almost without exception, the lender is unable to tell his side of the story because of Bank Act restrictions on financial disclosure of client information. I can tell you from experience that there is invariably two sides of these issues and the story conveyed by the media almost always deals only with the one point of view. And don't forget, those efforts by the bank to recover all or some part of its loans represents, in fact, the sort of responsible action that depositors come to expect in terms of safeguarding the deposit funds entrusted to the bank - the funds that are in turn loaned out to the borrower. By and large, the vast majority of farmers are responsible, honest borrowers. Unfortunately, the actions of a very small minority group are, in my opinion, casting an unfair reflection on the total

farm sector. Perhaps we're all learning in the process, and hopefully, mature judgment will rule in the future on behalf of both borrower and lender. We don't need this sort of drama at this point in time!

Debt moratorium legislation. When economic conditions tighten, the question of debt moratorium legislation invariably arises. While that process may temporarily solve a few financial problem cases, my guess is that it would turn back farm credit development by about 50 years. I would like to think that banks will continue to act in a responsible manner and that government will look to the long run negative impact of debt moratorium legislation rather than any fleeting short term gain that might accrue to such legislation. Again, let's hope that rational and considered thinking takes precedent over any precipitous moves.

Alternatives to liquidations. It's no secret that our farm land market is currently under pressure. Any large-scale forced sale of farm real estate will almost certainly create further major price declines. Lenders are going to have to recognize that sale of land for loan recovery at this point in time may not be a viable or desirable option. My guess is that where farm liquidation and disposal of assets is inevitable for whatever reason, the lender is going to have to look at ways of maintaining this security on a lease or rental basis until the real estate market improves to the

point where it can absorb the added acreage without an undue price break. And remember, a declining farm real estate market affects everyone - borrower, lender and remaining farmers alike.

Financial management. I can think of no other area that is more important today than that of being fully in tune with the financial aspects of the farm business. Borrowers and lenders are going to have to sharpen up their practices considerably if we're to minimize the potential damage that can occur during periods such as this. I'm confident that the needed adjustments are already taking place and greater efforts are still to follow. Together, we'll work it out - because a continued viable farm sector is just as important to the lender as to the borrower.

Risk lending! Frequently, we hear that banks should be prepared to participate in the downside risk that may be encountered in farming. Needless to say, banks do take risks as evidenced by the extent of loans that are written off each year. But we're not talking about any massive level of risk because quite simply, banks are not high risk lenders nor do they charge the type of interest rate that would support high risk lending. There just isn't the interest rate margin available for banks to absorb more than a nominal degree of extended risk. For instance, the average net return on total assets after taxes is usually in the range of 60 basis points or just over one-half of one percent on all loans. Clearly, that spread doesn't

provide much latitude for absorbing the sort of risk that may exist in many of the more speculative business ventures. And don't forget, when you talk about risk lending, you're not only talking about a level of interest rates that match this type of lending, but also, about an opportunity for the lender to share in any windfall gains that may accrue to the operation. I haven't heard too many borrowers offering to pay part of their windfall gains to a lender - nor does the lender expect it.

Fixed rate lending. I fully appreciate the stability in future farm planning that is brought about by fixed interest rates. In order to offer fixed interest rates, however, the lender must be able to match loan funds against deposit funds at any given level of interest rate. That process works fine when interest rates are reasonably stable, but has not been very workable during recent periods of highly volatile interest rates. What happens is simply that the lender must continue to honor low interest rate loan commitments while seeing his offset deposit base largely disappear as interest rates move upward. On the other hand, fixed rate loans put on the books at high rates will almost surely be paid off ahead of schedule while the offsetting deposit base will continue to hold at the high rates. The result is clearly a no win situation for the lender and as a result, most lenders have either adopted floating interest rates or dramatically shortened the period of time over which they are willing to commit a fixed rate. There are, however, ways of at least partially offsetting the

uncertainty of future payments due to changing interest rates. One of these methods involves the use of a fixed payment, floating interest rate loan. Under this option, the total amount of the loan payment, interest and principal, is guaranteed for a specific period, i.e. 2 or 3 years into the future, even though the interest rate moves with each change in prime. When prime rate goes down, the loan is simply repaid at a faster rate. When prime rate increases, the principal is repaid at a lower rate. The principal balance may even increase if the interest rates rise dramatically. Personally, I think that we'll see a greater use of this type of loan in the future as it is perhaps the best compromise available between standard fixed rate loans and regular floating rate loans.

Let me conclude on a positive note. I've tried to outline some areas of concern along with the current efforts to meet these concerns. But let's not forget that we're dealing with a highly cyclical industry - one that has historically been prone to wide swings in income from one period to another. When things get tough, we too often ignore the possibility of a future improvement. And when conditions are good, we're equally capable of forgetting that less buoyant times are probably already on the way. If we work together, keep our cool and play for the long run, I'm confident that it will be only a matter of time, perhaps less than we think, until we'll once more be looking at a buoyant farm economy.

PUBERTAL AND POSTWEANING ANESTRUS IN SWINE

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As swine production has moved from pasture-dry lot systems into confinement systems, the awareness by producers of the impact of reproductive inefficiency has increased due to high overhead costs which are associated with confinement systems. Pubertal and postweaning anestrus are two examples of reproductive inefficiency which have received attention the past five years. Maintenance of nonpregnant gilts through 9 months of age and open sows beyond 14 days after weaning increases feed and labor costs. Maximal reproductive efficiency from the sow herd requires that a high proportion of gilts reach puberty early; that sows show estrus within a few days of weaning, and that conception rate at first breeding of all females is high.

Pubertal Anestrus in Gilts

Factors that Affect Puberty in Gilts

1. Breed
2. Housing
3. Season
4. Social Influences
5. Nutrition
6. Disease

The first four of these will be discussed. The last two are important and should not be overlooked by swine producers.

Breed

The influence of breed on age at puberty has been documented in a number of studies for gilts reared under nonconfinement conditions (Robertson et al., 1951; Foote et al., 1956; Zimmerman et al., 1960; Holtman et al., 1975). At the Roman L. Hruska U.S. Meat Animal Research Center (MARC), we evaluated age at puberty and continuation of regular estrous cycles in five breed of gilts that were reared in total confinement (Table 1). Landrace gilts reached puberty earlier than the other four breeds, but 10% or more of the gilts in any of the five breeds were not showing regular estrous cycles by 9 months of age. The proportion of gilts which do not show estrus is economically important and varied with breed, but this usually receives minimal attention in studies on puberty in gilts. Gilts which are classified as prepubertal have small ovaries with no evidence of previous ovulation, and their uteri are not fully developed. Gilts which are classified as behavioral anestrus have uteri that shows signs of estrogen and progesterone stimulation, and their ovaries show that ovulation has occurred. Behavioral anestrus is not observed in all studies with confinement-reared gilts (Rampacek et al., 1981). Gilts of breeds and breed combinations which reach puberty early should be bred early. When nutrition is adequate, breeding at an early age improves lifetime production efficiency (Brooks and Smith, 1980).

Housing

To evaluate the influence of housing on pubertal development, gilts within litters were separated at 2.5 months of age and reared in dry lots or in a total confinement building in groups of 16 to 18 gilts per pen. Type of housing had no influence on average age at puberty for those gilts that reached puberty but more gilts that were reared in dry lot reached puberty by 9 months of age than those reared in confinement (Table 2). Gilts reared in confinement had a higher incidence of both prepubertal reproductive tracts and behavioral anestrus.

Season

The influence of season of rearing is illustrated by data presented in Table 3. Within the two seasons, gilts were divided into two groups according to age (winter, periods 1 and 2; summer, periods 3 and 4). Age of gilts within each period varied by no more than three weeks, and within each season, age of gilts varied by no more than six weeks. When gilts were reared during the winter, there were no differences in pubertal traits between those reared during the two different periods. However, for gilts reared during the summer season, a greater percentage of the older gilts (period 3) were showing regular estrous cycles at 9 months of age than the gilts which were three weeks younger (period 4). This difference is speculated to be the result of higher temperatures that occurred later in summer and affected pubertal development in gilts in period 4 more than in the slightly older gilts in period 3. Other investigators have reported that for gilts observed in slaughter houses, a greater percentage have prepubertal reproductive tracts during the late summer than at other times of the year (Wiggins et al., 1950; Scanlon and Krishnamurthy, 1974). Season includes changes in temperature and daylength. Elevated temperatures have been shown to adversely affect estrus in gilts. However, studies on the influence of daylength on pubertal development in gilts have produced conflicting data; thus, recommendations as how to use controlled daylength to improve pubertal development are not possible at this time.

Social Influences

Rearing gilts individually has detrimental effects on pubertal development (Jensen et al., 1970; Mavrogenis and Robison, 1976), but rearing gilts as groups of different numbers per pen has produced no major effects. In addition, efforts to show an effect of crowding on pubertal development were unsuccessful (Table 4). Gilts were reared from 3 to 8 months of age in pens with 4 ft^2 per pig, or in pens in which floor space was restricted to 25% or 50% less that of controls. Pen size was increased by 1 ft^2 per pig as average weight of each pig increased in 30 lb. increments. The proportion of gilts reaching puberty and average age at puberty were not affected by crowding.

The social influence which has consistant effects on pubertal development of gilts is boar exposure. Exposure of gilts which are approaching puberty to a mature boar induces puberty at an earlier age in both nonconfinement- and confinement-reared gilts (Zimmerman et al., 1969, 1974; Brooks and Cole, 1970; Thompson and Savage, 1978). Boars should be sexually mature, and exposure can be continuous or once daily (Kirkwood and Hughes, 1980, 1981). Boar exposure should be initiated when gilts are approaching puberty because exposure when gilts are too young may delay pubertal development.

Recommendations Relative to Pubertal Development of Gilts to Enhance Production Efficiency

1. Select breeds and breed combinations that reach puberty early
2. Breed gilts at a young age and provide adequate nutrition to sustain growth

3. Use boar exposure with gilts that are approaching puberty
4. Do not maintain acyclic gilts beyond 8.5 to 9 months of age

Postweaning Anestrus in Sows

Factors that Affect Interval to First Postweaning Estrus

1. Length of Lactation
2. Breed
3. Parity
4. Season
5. Nutrition

Length of Lactation

As length of lactation increases, the interval from weaning to estrus decreases, as does the variation of this interval. At present, a lactation period of 21-25 days is the most profitable for optimally managed confinement systems (Varley, 1982). Weaning pigs from sows very early in lactation increases the incidence of cystic ovaries in sows; whereas, a lactation period longer than 21-25 days reduces annual production potential of sows.

Breed

The influence of breed and crossbred combinations on the interval from weaning to estrus is well documented. Dyck (1971) reported that the postweaning estrous interval was 5.5 days for Yorkshire and 14.3 days for Lacombe sows after a 42-day lactation period. In addition to length of postweaning estrous interval, the percentage of sows which recycle should be considered. Fahmy et al. (1979) observed in two-way crossbred sows of either the Yorkshire or Large Black breed a high proportion of first litter sows showed estrus within 50 days of weaning. However, postweaning estrous interval was shortest in crosses which involved Yorkshire, Hampshire, Berkshire and Tamworth breeds. In studies conducted at MARC over a 3-year period, slight but significant differences were observed between breeds for postweaning estrous interval (Table 5). Greater differences between breeds were observed for proportion of sows that showed estrus within 10 days after weaning.

Parity

First litter sows generally have a longer postweaning estrous interval than multiparous sows (Table 5). Producers that are replacing a higher proportion of their breeding herd may experience reduced production efficiency due to the longer postweaning interval of first litter sows.

Season

During late summer and early fall, postweaning estrous interval is longer, and more sows remain acyclic (Hurtgen et al., 1980; Levis, 1979) than at other times of the year. Elevated temperature is associated with an increase in the percentage of sows with abnormal estrous cycles (Corteel et al., 1964), and first parity sows are affected to a greater extent than multiparous sows.

Nutrition

Energy intake has a pronounced effect on postweaning estrous interval. Reese et al. (1982a,b) reported that 31.8% more sows showed estrus by day 7 after weaning when daily energy intake during lactation was increased from 8 to 16 Mcal of ME (Table 6). Both groups of sows in these studies were fed an equal amount of crude protein, vitamins, and minerals. Because first litter sows have reduced daily feed consumption during lactation compared to multiparous sows, this provides a partial explanation for the longer postweaning estrous interval

in first litter sows. Energy content of the lactation ration can be increased by adding fat so that all sows will consume the recommended 14 Mcal of ME/day.

Recommendations Relative to Postweaning Estrus to Enhance Production Efficiency

1. Wean litter at 21-25 days postpartum
2. Use breeds and breed combinations in which a high proportion of sows return to estrus early
3. Manage first litter sows separate from multiparous sows
4. Minimize farrowing of first litter sows in late summer
5. Adjust lactation ration so that sows consume 14 Mcal of ME/day

References

Brooks and Cole. 1970. J. Reprod. fert. 23:435.
Brooks and Smith. 1980. Livestock Prod. Sci. 7:67.
Christenson and Ford. 1979. J. Anim. Sci. 49:743.
Christenson. 1981. J. Anim. Sci. 52:821.
Corteel et al. 1964. Fifth Intern. Congr. Anim. Reprod. Artif. Insem.
Dyck. 1971. Can. J. Anim. Sci. 51:135.
Fahmy et al. 1979. Anim. Prod. 29:193.
Foote et al. 1956. J. Anim. Sci. 15:959.
Ford and Teague. 1978. J. Anim. Sci. 47:828.
Holtman et al. 1975. Anim. Prod. 21:199.
Hurtgen et al. 1980. J. Am. Vet. Med. Asoc. 176:119.
Jensen et al. 1970. J. Anim. Sci. 31:745.
Kirkwood and Hughes. 1980. Anim. Prod. 31:205.
Kirkwood and Hughes. 1981. Anim. Prod. 32:211.
Levis. 1979. Hog Farm Management, September, p. 15.
Maurer et al. 1982. J. Anim. Sci. 55 (Suppl. 1):370.
Mavrogenis and Robison. 1976. J. Anim. Sci. 42:1251.
Rampacek et al. 1981. Theriogenology 15:491.
Reese et al. 1982a. J. Anim. Sci. 55:590.
Reese et al. 1982b. J. Anim. Sci. 55:867.
Robertson et al. 1951. J. Anim. Sci. 10:841.
Scanlon and Krishnamurthy. 1974. J. Anim. Sci. 39:160.
Thompson and Savage. 1978. J. Anim. Sci. 47:1141.
Varley. 1982. In: Control of Pig Reproduction, ed. by Cole and Foxcroft.
Wiggins et al. 1950. J. Anim. Sci. 9:277.
Zimmerman et al. 1960. J. Anim. Sci. 19:687.
Zimmerman et al. 1969. J. Anim. Sci. 29:203.
Zimmerman et al. 1974. J. Anim. Sci. 39:230

Table 1. Pubertal Development in Gilts Reared in Confinement

Trait	Landrace	Large White	Hampshire	Duroc	Yorkshire
% of gilts cyclic by 6 months of age, %	69	4	11	0	3
% of gilts cyclic by 9 months of age, %	80.9	89.5	78.7	75	58.8
Average age at puberty, days	173	211	207	224	221
% prepubertal	2.9	8.8	6.7	22.7	21.8
% behavioral anestrous	14.7	0.9	13.5	2.3	16.8

Adapted from Christenson and Ford, J. Anim. Sci. 49:743-751, 1979.

Table 2. Influence of Housing on Pubertal Development in Gilts

Trait	Confinement	Dry lot
% of gilts cyclic at 9 months	71.3	85.2
Average age at puberty, days	198	191
% prepubertal	10.9	4.9
% behavioral anestrous	14.6	6.6

Adapted from Christenson, J. Anim. Sci. 52:821-830, 1981.

Table 3. Influence of Season on Pubertal Development in Gilts

	Season			
	October to April		April to October	
Trait	Period 1	Period 2	Period 3	Period 4
% of gilts cyclic at 9 months of age	82.0	80.6	84.7	65.6
Average age at puberty, days	194	201	188	195
% prepubertal	4.1	7.1	7.1	13.4
% behavioral anestrous	12.8	10.4	2.5	16.7

Adapted from Christenson, J. Anim. Sci. 52:821-830, 1981.

Table 4. Estrus in Gilts Reared in Pens of Restricted Size

	Proportion expressing estrus by 8 months of age			Avg age at first estrus (days)		
	0%	25%	50% [a]	0%	25%	50% [a]
Trial I	9/15	...	8/15	218	...	215
Trial II	23/24	24/24	24/24	200	196	207
Trial III	11/11	12/12	11/12	190	184	201

[a] % = Percentage of restricted floor space.
From Ford and Teague, J. Anim. Sci. 47:828-832, 1978.

Table 5. Breed and Parity Influence on Postweaning Estrus

	Postweaning estrus interval (days)	% cyclic within 10 days of weaning
Breed		
Landrace	5.6	84
Large White	6.7	96
Yorkshire	7.4	74
Chester White	8.6	69
Parity		
First	9.4	67
Second	6.0	88
Third	5.8	91

From Maurer et al., unpublished data.

Table 6. Effect of Energy Intake on Postweaning Estrus

Day postweaning	8 Mcal of ME/day	16 Mcal of ME/day
	Cummulative % in estrus	
7	61.8	93.6
14	74.5	97.2
21	74.5	98.2

Adapted from Reese et al., J. Anim. Sci. 55:590-598 and 55:867-872, 1982.

FEEDING VALUE OF FROST-DAMAGED CANOLA SEED

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The 1982 Canola crop was severely damaged due to frost and recently the Canadian Grain Commission announced that 38% of the canola/rapeseed crop will grade No. 3 Canada and Sample. The amount of this low-grade seed that will become available as feed is not clear at the present time. The availability of high-quality canola seed and the severity of the forst damage are important factors that will influence the extent to which the frost-damaged seed will be used in the crushing industry.

The majority of the research work conducted to date regarding the feeding value of canola/rapeseed seed has been with high-quality sound seed as opposed to frost-damaged off-grade seed. Typically sound seed contains 21-23% protein, 40-42% oil and 7-8% crude fiber. Available energy values that have been used for this seed in diet formulations are: 4400-4600 kcal/kg ME for poultry; 4800 kcal/kg DE for swine; and a DE 125-130% that of wheat for ruminants.

The degree to which the feeding value of frost-damaged, off-grade canola seed approximates that of sound seed can be estimated by comparing the composition of the different seed samples. Typical oil and protein contents of frost-damaged seed from the 1972-73 crop year are shown in Table 1. These data indicate a significant reduction in the oil content of frost-damaged seed. Chemical analyses (oil, protein, fiber) should be conducted on samples of frost-damaged seed to determine the severity of the frost damage. In addition care should be exercised when using canola seed that is of lower quality than the bottom statutory grade because of the potential and variable content of weed seeds and foreign matter. Again chemical analyses could be used to aid in predicting the feeding value of the off-grade seed. Canola contains a relatively low content of glucosinolates and consequently heat treatment to inactive mycosinase enzyme has not shown to be as beneficial as was shown to be the case for high-glucosinolate rapeseed. In this regard, however, uncooked canola seed should be used at low levels in diets for livestock and poultry and should not be combined with canola meal in diets.

From research conducted at the University of Saskatchewan it has been recommended that frost-damaged canola seed may be used in finishing cattle diets at levels up to 20-30%. As indicated above the feeding value will vary depending upon the severity of frost damage and the content of weed seeds or other foreign matter. The range in feed value may be from a digestible energy about 125% that of wheat to that equivalent to low-quality forage which is the value assigned to canola refuse screenings.

Sound canola seed in the flaked form has been fed to dairy cattle at the University of Saskatchewan with no undesirable effects on rumen fermentation or milk yield and composition. Limited data is available, however, regarding the feeding value of frost-damaged seed for dairy cattle. In a recent study from the University of Manitoba equivalent production was obtained when dairy cows were fed graded levels (0-2 kg/day) of frost-damaged canola seed as a top dressing in a grain-silage feeding program (Table 2). The canola seed contained 35% oil, 24% protein and 16% ADF.

With regard to the feeding of frost-damaged canola seed to swine a level not exceeding 10% of the diet is recommended. In addition it is suggested that the frost-damaged seed he fed only to market hogs weighing over 30 kg and not fed to pregnant or lactating sows. These recommendations are made realizing a lack of information on frost-damaged canola seed and based on the fact that reduced performance was obtained in some trials with uncooked, high glucosinolate rapeseed.

The use of sound canola seed in diets for broiler chickens has been evaluated recently by Alberta Agriculture in large scale demonstration trials. Results from feeding trials utilizing eight thousand broiler chickens indicated that flaked canola seed could be included in the diets of broiler chickens at up to 10% without affecting mortality, growth rate or feed efficiency (Table 3). Research was conducted at the University of Manitoba to evaluate the feeding value or frost-damaged rapeseed (1972-73 crop year). Ground or extruded rapeseed was incorporated into wheat-based diets and fed to broiler chickens in a 4-week feeding trial. Growth performance was decreased among the birds fed the ground high-glucosinolate rapeseed - an effect which was partially alleviated by heat treatment (Table 4). Recent work from the University of Guelph indicates that 10% sound canola seed may be used in diets for laying hens without any adverse effect on production. It is recommended to use up to 10% frost-damaged canola seed in diets for poultry as long as the composition of the seed approximates that of sound seed otherwise the feeding value should be discounted based on the oil and fiber contents of the sample. In addition care should be exercised regarding the use of severely frost-damaged samples since these seeds may contain relatively high levels of glucosinolate hydrolysis products.

Frost-damaged off-grade canola seed may be used as a feed for livestock and poultry. The feeding value of the seed may be assessed based on the results obtained with sound canola seed. However, because of the wide variation in composition as influenced by severity of frost damage and content of weed seeds and foreign matter it is important that samples be analysed prior to diet formulation.

Table 1. Oil and Protein Content of Frost Damaged Rapeseed Collected in Manitoba during the 1972-73 Crop Year

Location	% Composition (90% dry matter)	
	Oil	Protein
Roblin	32.7	21.1
Swan River	34.4	23.1
Arborg	35.8	21.4
Pilot Mound	37.1	19.4
Virden	41.6	18.2

Table 2. Effect of Frost-Damaged Canola Seed on Production in Dairy Cows[1]

	Canola Seed Topdressing (kg)				
	0	0.5	1.0	1.5	2.0
Milk production (kg/day)					
Total	28.6	28.4	27.9	28.8	28.9
FCM	24.9	24.9	27.8	26.3	24.0
Milk composition (%)					
Fat	3.4	3.3	3.9	3.6	3.2
Lactose	4.6	4.9	4.4	4.5	4.8
Protein	3.4	3.3	3.9	3.6	3.2

[1]Preliminary date

Table 3. Diet Composition and Growth Performance for Broiler Chickens Fed Canola Seed

Item	Starter Period (0–28 days)		Finisher Period[1] (29–46 days)	
	Control	Canola	Control	Canola
Diet Ingredients				
Wheat, %	55.85	51.35	63.85	59.35
Tallow, %	5.0	2.5	5.0	2.5
Soybean meal, %	33.0	30.0	25.0	22.0
Canola seed, %	0.0	10.0	0.0	10.0
Growth Performance				
Experiment 1				
Body weight, g	802	773	1740	1733
Feed/gain	n.a.[2]	n.a.	1.99	1.95
Mortality, %	n.a.	n.a.	3.9	2.9
Experiment 2				
Body weight, g	953	951	1956	1942
Feed/gain	n.a.	n.a.	1.99	2.04
Mortality, %	n.a.	n.a.	5.2	3.8

[1]Data on growth performance is for the entire feeding period.

[2]n.a. = no analysis.

Table 4. Utilization of Ground and Extruded Frost-damaged Rapeseed[1] by Broiler Chickens in a 4-week Feeding Trial

	Diet		
		Rapeseed (10%)	
Growth Performance	Control[2]	Ground	Extruded
Feed intake, g	1531±13	1464±55	1525±32
Body weight gain, g	850±11	760±32	824±11
Feed/gain	1.80±.01	1.93±.02	1.85±.04

[1]Rapeseed was combined with wheat (60:40) and ground in a hammer mill or extruded with a Brady crop cooker.

[2]Control diet was formulated by supplying an equivalent amount of rapeseed oil and protein from crude rapeseed oil and commercial rapeseed meal as supplied by the whole seed.

Straws and Stover

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Cereal straws and corn stover have played a role in livestock diets for many years. The extent of their use will depend upon the availability of other feed sources in any given year and the price of those fed sources. There is considerable interest in using low quality roughages as a source of dietary roughage and also processing of these roughage sources to improve nutrient availability.

Straws - The residues from oats, barley and wheat supply the vast majority of the straw used in animal diets. Quality of straw can vary widely but it is generally considered that their order of desirability is oats, barley, wheat, rye and then some of the grass seed type straws. Nutrient levels in all straws are low: protein levels range from about 205% but digestibility of the protein is usually low. Energy or TDN values for straws can also vary widely 30-48% TDN with oats and barley straws generally being the highest in TDN. Vitamins and minerals also generally low in straws for most classes of stock and must be adequately supplemented.

Stover - Corn stover is the residue left after the cobs are harvested. It can contain a variable amount of leaf material (which increases its value) as well as stalks and has sometimes been referred to as stalklage. The components of corn residue rank in digestibility, in descending order as folows: remaining grain, husk, leaf, cob and stalks. Corn stover can provide adequate level of energy to provide for maintenance levels of nutrition but additional levels of protein vitamins and minerals must be

supplemented. Stover will have a TDN value of about 48% and a protein level of about 4.0-4.5%.

Treating Crop Residues

Crop residues, because of the high fiber content and poor digestibility, are inefficiently utilized by animals. This poor digestibility is related to the extent of lignification of the cell wall component of these low quality roughages. There have been many methods of treatment attempted to decrease lignification or increase digestibility with varying degrees of success. Some of these include:

a) grinding and pelleting

b) sodium hydroxide

c) potassium hydroxide

d) ammonium hydroxide

e) ammoniation and

f) pressurized heating.

Responses to some of these processes have resulted in increases in digestibility of 5 to 30%. Increases in use of these processes and thus, increased use of crop residues will depend on cost factors and on farm practicality.

Protein and Amino Acid Content

of Manitoba Corn

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In 1981, hybrid corn grain reached its highest production level with a final estimate of 17,000,000 bushels produced. This amount properly supplemented and fed only to pigs, would have been sufficient for all Manitoba market pigs produced in 1981 - including the feed for breeding stock.

Because of its low protein content, corn requires a high level of supplementation to make a balanced ration. Because of this, it is important to know how the level of protein and essential amino acids in Manitoba corn compare with published values. The feed analysis service laboratory of the Manitoba Department of Agriculture determined the protein content and our department had access to the same 49 corn grain (1981) samples, courtesy of the Manitoba Corn Growers and their Agro-Man project, for amino acid analysis.

Table I gives the average values for protein and the essential amino acids lysine, methionine-cystine, threonine and tryptophan. The lysine, methionine-cystine and tryptophan values all fall within the range or exceed the NRC values noted. However, the level of threonine is considerably lower than the NRC value given. Calculations show that using the recommended levels of supplement or protein sources with this Manitoba corn would still supply enough of the threonine to meet the requirements of growing-finishing pigs. A check of recent barley and wheat samples showed threonine values which were close to NRC levels, thus, the low levels of threonine are not totally an artifact of the analytical system, so that threonine levels in Manitoba corn grain require further study.

From the 49 samples used, a selection of 40 samples, representative of four locations and three varieties, were analysed statistically and the results are shown in Tables 2 and 3. In general, the levels of protein and the four essential amino acids studied were positively correlated. The results do show a highly significant difference for variety ($P<0.01$) and a significant difference for locating ($P<0.05$). The NKPX variety and Eastern Manitoba samples have the lowest protein and essential amino acid contents. Location differences would be due in part to different weather conditions and a variety of agronomic factors. Some of the same arguments could probably be used for the variety differences.

Summary

1. With the exception of threonine, protein, lysine, methionine-cystine and tryptophan values for the 1981 corn crop were close to NRC published values. The fact that some 25% of the varieties analyzed less than 8% protein, with corresponding levels of essential amino acids, indicate the need for analysis of at least protein/lysine.

2. Significant location and variety differences were noted which should be checked again in future corn crops.

3. Despite the lower protein and amino acid content, 1981 corn yields were estimated at 75 bushels to the acre making this crop quite competitive with other cereals.

Table I: Content of selected essential amino acids in Manitoba corn (1981 crop) in comparison to NRC feed Composition values.

Amino Acid	Manitoba Corn[1] (%)	NRC (%)
Lysine	0.27(.19-.34)[2]	0.24[3]-0.25[4]
Meth-Cystine	0.40(.32-.59)[2]	0.40[3]-0.39[4]
Threonine	0.25(.19-.33)[2]	0.39[3]-0.35[4]
Tryptophan	0.05(.03-.09)[2]	0.05[3]-0.08[4]
Protein	8.5	8.8[3,4]

1 - Forty-nine samples.

2 - Range in values.

3 - Nutrient requirements of swine - NRC 1979.

4 - U.S. - Can., Tables of Feed Composition - NRC 1982.

Table II: Content of selected essential amino acids (%) in Manitoba corn[1] (1981 crop) as affected by location.

Amino acid	East. Man. - (12)[2]	Interlake - (7)[2]	Treherne - (13)[2]	Souris (8)[2]
Lysine	.25	.27	.30	.31
Meth-cystine	.41	.42	.41	.43
Threonine	.25	.25	.25	.28
Tryptophan	.06	.06	.07	.07
Protein	7.9	8.7	8.5	8.8

1 - Forty samples.

2 - No. of samples/location.

Table III: Content of selected essential amino acids (%) in Manitoba corn[1] (1981 crop) as affected by variety.

Amino Acid	Pride (3995) (14)[2]	Pioneer (1108) (13)[2]	NKPX (403) (13)[2]
Lysine	.29	.29	.26
Meth-cystine	.44	.42	.39
Threonine	.27	.26	.24
Tryptophan	.07	.07	.06
Protein	8.9	8.6	7.9

1 - Forty samples.

2 - No. of samples/variety.